Vogt: Heavy Flavor Production

FONLL designed to cure large logs of p_T/m for $p_T \gg m$ at fixed order (FO)

Includes resummed terms (RS) of order $\alpha_s^2(\alpha_s \log(p_T/m))^k$ (leading log – LL) and $\alpha_s^3(\alpha_s \log(p_T/m))^k$ (NLL), subtracts FO terms, keeping only log mass dependence ("massless" limit of FO – FOM0), calculated in the same renormalization scheme

FO scheme change needed since heavy flavor is heavy while RS includes heavy flavor as active light degree of freedom

$$\text{FONLL} = \text{FO} + (\text{RS} - \text{FOM0})G(m, p_T) \; ; \; G(m, p_T) \to 1 \text{ as } m/p_T \to 0$$

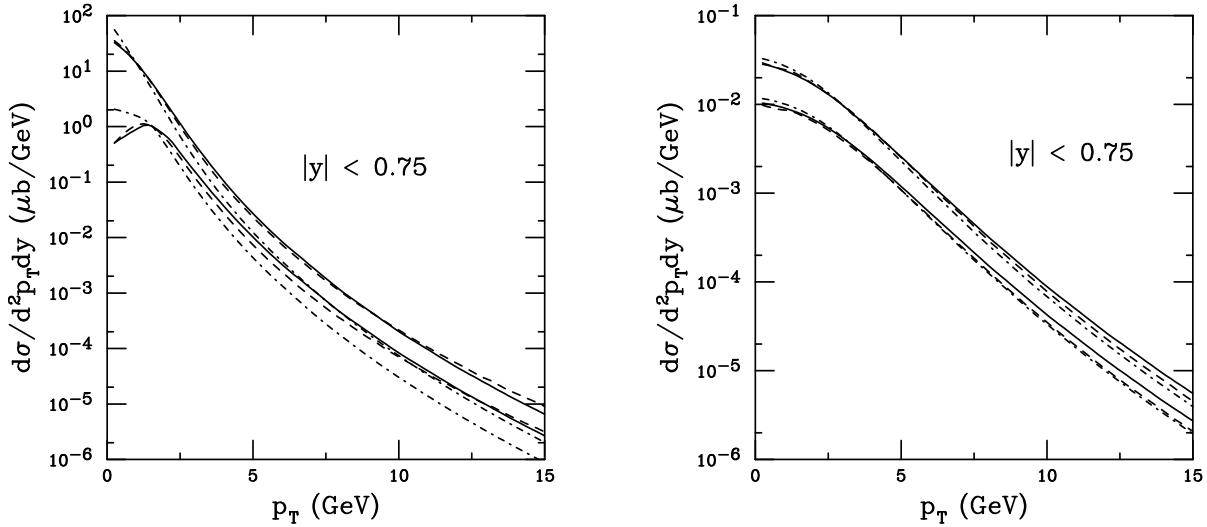

Figure 1: The heavy quark theoretical band as a function of p_T for FONLL (solid curves) and NLO (dashed curves) in $\sqrt{s} = 200$ GeV pp collisions in the rapidity range $|y| \leq 0.75$. Also shown is the heavy flavor meson uncertainty band, all using the CTEQ6M parton densities. The left-hand plot gives the c quark and D meson results while the right-hand plot shows the b quark and B meson results.